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The Economic Effects of Purity Standards in Biotech Labeling Laws

Konstantinos Giannakas
University of Nebraska-Lincoln

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University of Nebraska–Lincoln Extension

Institute of Agriculture & Natural Resources
Department of Agricultural Economics
http://agecon.unl.edu/cornhuskereconomics

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Market Report	Yr Ago	4 Wks Ago	9/23/11
Livestock and Products, Weekly Average			
Nebraska Slaughter Steers, 35-65% Choice, Live Weight.	$98.11	$113.01	$115.82
Nebraska Feeder Steers, Med. & Large Frame, 550-600 lb.. . . .	123.51	146.23	141.93
Nebraska Feeder Steers, Med. & Large Frame 750-800 lb.	111.44	135.80	137.07
Choice Boxed Beef, 600-750 lb. Carcass.	157.60	187.25	184.50
Western Corn Belt Base Hog Price Carcass, Negotiated.	80.84	92.11	88.21
Pork Carcass Cutout, 185 lb. Carcass, 51-52% Lean..	90.80	104.04	96.63
Slaughter Lambs, Ch. & Pr., Heavy, Wooled, South Dakota, Direct.	144.87	*	178.25
National Carcass Lamb Cutout, FOB.	333.25	407.57	406.35
Crops, Daily Spot Prices			
Wheat, No. 1, H.W. Imperial, bu..	5.88	7.78	6.18
Corn, No. 2, Yellow Omaha, bu.	4.67	7.53	6.25
Soybeans, No. 1, Yellow Omaha, bu.	11.00	14.04	12.11
Grain Sorghum, No. 2, Yellow Dorchester, cwt..	8.25	12.86	10.32
Oats, No. 2, Heavy Minneapolis, MN , bu.	3.22	3.94	3.46
Feed			
Alfalfa, Large Square Bales, Good to Premium, RFV 160-185 Northeast Nebraska, ton.	*	185.00	185.00
Alfalfa, Large Rounds, Good Platte Valley, ton..	82.50	117.50	117.50
Grass Hay, Large Rounds, Good Nebraska, ton.	*	85.00	92.50
Dried Distillers Grains, 10% Moisture, Nebraska Average.	125.00	210.00	197.50
Wet Distillers Grains, 65-70% Moisture, Nebraska Average.	47.00	70.50	72.50
***No Market**			

Discussions on the appropriate regulatory norms for biotech or genetically modified (GM) foods date back to the early 1980s. Twenty-five years later, a consensus on what such norms should be remains elusive. While the safety of GM foods prior to their commercialization is evaluated through, more or less, the same methods around the world, countries differ widely on their treatment of GM foods that have been deemed safe for market introduction. Some countries, including the United States and Canada consider these GM foods substantially equivalent to their conventional counterparts, and do not require segregation and labeling of these products. Others, including the European Union (EU), Japan, South Korea, New Zealand, Australia and China have introduced mandatory labeling regimes.

Not all mandatory labeling laws for GM foods are "created equal" however, as they differ substantially in their standards. For instance, the EU requires mandatory labeling of all food ingredients, additives and flavorings, animal feeds and feed additives as well as highly processed foods (such as refined oils) that contain more than 0.9 percent GM material. Other countries have more liberal laws. Japan and South Korea, for instance, mandate labeling for food products that contain major ingredients with more than five and two percent of GM material, respectively, while they exclude animal feeds, highly processed foods and oils from labeling requirements.

Mandatory labeling laws allow for the presence of GM material in non-GM food to cope with perfect segregation and purity of non-GM food being costly and often not practically feasible. Purity standards are typically set up in terms of tolerances or purity thresholds, defining the amount of GM material that triggers labeling of a product as "GM." Since the GM content allowed in non-GM food is generally meant to be "accidental and unavoidable," these purity thresholds are often referred to as "adventitious presence," or AP thresholds.

While most mandatory labeling regimes include AP thresholds, the establishment of these thresholds has generally been an arduous process. Consider the EU experience, for instance. Even though the EU introduced mandatory labeling for Genetically Modified Organisms (GMOs), and food derived from GMOs in 1997, it took two more years to set the purity threshold at one percent. Then in 2001, the EU Commission adopted two new legislative proposals that sought to extend mandatory labeling to animal feeds and feed additives, as well as highly refined oils, sugars and starches. Purity thresholds were revisited, and after two years of contentious deliberation they were set at their current level of 0.9 percent. Since that time, EU regulators have sought to put the last piece of their GM regulatory framework in place by establishing purity thresholds for conventional planting seeds. Once again, the process has been highly contentious, with some interest groups calling for thresholds set at the level of detectability, typically 0.1 percent, and others advocating higher thresholds that would presumably minimize disruptions in the agri-food supply chain, typically 0.5 percent or more. The EU Commission has attempted to find the "middle ground" – discussing thresholds between 0.3 and 0.5 percent – with little success.

Although the differences in these purity standards seem minute, they have caused strong disagreements. While the underlying causes of discord seem to be rooted, at least in part, in trade and political considerations, little is known about the market and welfare implications of different purity thresholds. What recent research has shown is that purity thresholds impact the production and segregation costs in non-GM supply channels (cost effect), as well as the consumer valuation of non-GM foods (utility effect).

In a study published in the *Journal of Agricultural and Food Industrial Organization* (Giannakas, et al., 2011), we seek to analyze the market and welfare effects of purity thresholds for non-GM foods subject to such thresholds. In particular, the analysis focuses on the effect of allowing the presence of GM material in non-GM foods on the prices and quantities of the GM and non-GM products, the profits of the product suppliers and consumer welfare.

Our analysis shows that the cost and utility effects of increased AP thresholds reduce the price of non-GM products and have an effect on the equilibrium price of GM products, the quantities of GM and non-GM products and the welfare of the groups involved. The market and welfare effects of increased AP thresholds are shown to be case-specific and dependent on the relative magnitude of the cost and utility effects; the distribution of consumer preferences and the level of aversion to GM products; the production, processing and marketing costs along the GM and non-GM supply chains; the segregation and labeling costs of the two products; and the market power present in the supply channels of the GM and non-GM products. It is important to note that an "as low as technically possible" threshold does not necessarily correspond to maximum consumer welfare. In fact, our analysis suggests that under certain circumstances it is possible to improve the welfare of *all* GM and non-GM product consumers through a more liberal AP threshold for non-GM foods.

In addition to identifying the effect of purity standards on prices, quantities and the welfare of the groups involved, the analysis shows that a change in the AP threshold can create winners and losers not only among the consumers, but also among the suppliers of the two products. The identity of these winners and losers is determined by the relative cost and utility effects. For instance, while an increase in the AP threshold under a low cost effect and a high utility effect results in benefits for suppliers of GM products and losses for consumers of GM and non-GM products and suppliers of non-GM products, the same reduction under a high cost effect and a low utility effect has the exact opposite outcome for the interest groups involved.

These results have important implications for policy design and the political economy of AP thresholds. The existence of nonlinearities in the cost and utility effects of purity thresholds imply that, at low AP thresholds, even small changes in these thresholds could have large welfare and distributional effects. The results can then help explain the strong disagreements that have been observed in EU negotiations for seemingly minute shifts in AP thresholds.

In general, potential winners and losers from regulatory changes in AP thresholds should be expected to politically position themselves in order to serve their interests. Our analysis can be utilized to provide insights on the position of the different groups in negotiations about AP thresholds and the political economy of setting these thresholds. A key finding of our analysis is that the very same group could either support or oppose an increase in AP thresholds, depending on the particular market conditions (that determine whether such increase would lead to gains or losses). Our results can, therefore, provide some rationalization of seemingly "irrational" behaviors in the marketplace.

Consider the organic markets in the EU and the U.S., for instance. Until recently, EU regulations prohibited the presence of GM material in organic products requiring these products to be GM free. With low segregation costs (due to a negligible domestic GM production) and high expressed consumer aversion to GM foods, our analysis suggests that European consumers and producers of organic products should have no interest in increased AP thresholds.[1] This may explain why Council Regulation No. 834/

[1] The low segregation costs and the high European consumer aversion to GM products suggest that the utility effect of increased AP thresholds dominates the cost effect in the EU. In such a case, our analysis reveals that increased AP thresholds result in losses for the consumers and producers of non-GM products.

2007, allowing products with up to 0.9 percent GM content to be labeled as "organic," while intending "to reduce the segregation and identity preservation costs incurred by the organic sector," resulted in an outcry by the European organic industry.

Conversely, with relatively higher production and segregation costs (due to a widespread adoption of GM crops and a significant domestic GM production), and considerably lower consumer aversion to GM products, the cost effect of increased AP thresholds should dominate the utility effect in the U.S. Our analysis then indicates that, unlike their European counterparts, American consumers and organic producers should not favor a zero AP threshold policy. The position of the Organic Trade Association (OTA), which is a membership-based association for the organic industry in North America, reads: "OTA rejects a zero-tolerance policy at this time, on the grounds that obtaining a zero level of GMOs may not be possible in the U.S., due to widespread contamination." In fact, "OTA does not support setting any tolerance level" as "organic production is a process guarantee" which is consistent with the current U.S. policy on organics.

In closing, it is important to reiterate the significance of purity thresholds in labeling and coexistence of GM and non-GM foods. Purity thresholds define what a "non-GM" food is; they influence its costs of production, segregation and distribution; they impact consumer willingness-to-pay for non-GM foods; they influence the share of GM and non-GM foods in the market place; and they ultimately affect prices and welfare. Given the prevalence and importance of purity thresholds, it is surprising how little research exists on their market and welfare effects. Our study makes some progress in this direction and provides useful insights for understanding the behavior of stakeholder groups in policy negotiations.

Our results also point to particular directions where additional research is needed. Since the market and welfare effects of purity thresholds have been shown to depend on the relative magnitude of their cost and utility effects, reliable estimates of these cost and utility effects would be of paramount significance for the interest groups involved. They are also essential for the design of a solid economic policy on GM food labeling standards.

This article is based on:

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Konstantinos Giannakas, (402) 472-2041
Professor of Agricultural Economics
Dept. of Agricultural Economics
University of Nebraska-Lincoln
kgiannakas2@unl.edu